## Space Weather Forecast

Issued on Wednesday 22 January 2025 at 13:08 Local

**This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales**

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**Space Weather Forecast Headline: Isolated Moderate class flares likely with a slight chance of X-class (Strong) flares.**

**Analysis of Space Weather Activity over past 24 hours**

**Solar Activity:** Solar activity remained at Moderate levels, with an isolated Moderate-class flare at 22/1106 UTC from the largest sunspot group on the disc.

There are currently eight sunspot regions on the Earth-facing disc. The largest and most magnetically complex of these is located in the southwest quadrant, and was responsible for the flare mentioned above. A moderate size, but magnetically simpler bipolar region is located in the northwest. A region in the southeast has increased in magnetic complexity recently. All remaining spots are smaller and have shown little overall recent change.

A coronal mass ejection (CME) looks to have been emitted in association with the Moderate-class flare mentioned above. Given its near centre-disc location some Earth-directed component is likely, with analysis awaiting the relevant imagery to come in.

**Solar Wind / Geomagnetic Activity:** Ongoing fast but easing winds from a coronal hole were observed. Solar wind speed saw a gradual decline from elevated to slightly elevated levels (570 km/s to 460 km/s). The Interplanetary Magnetic field was Weak throughout, with the north-south component also varying Weakly. The resultant geomagnetic activity was Quiet to Unsettled (Kp1-3).

**Energetic Particles / Solar Radiation:** The count rate of energetic particles (high energy protons) persisted at Background with no Solar Radiation Storms occurring.

**Four-Day Space Weather Forecast Summary**

**Solar Activity:** Moderate activity is forecast, with isolated Moderate-class flares likely. There is a slight chance of isolated Strong flares.

**Solar Wind / Geomagnetic Activity:** A coronal mass ejection (CME) associated with the Moderate-class flare on 21 Jan has been modelled and gives a possible glance past Earth early on 25 Jan.

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Solar winds are currently slightly elevated, around 470 km/s, but on a slow downward trend. This gradual reduction in wind speeds is expected to continue as the influence of the fast wind from a coronal hole wanes. However, should the 21 Jan CME glance Earth on 25 Jan a temporary increase may occur.

Generally Quiet to Unsettled geomagnetic activity is expected, with a reducing chance of Active intervals through the period. However, there is a slight chance of G1/Minor Geomagnetic Storm intervals early on Day 4 (25 Jan) should any CME impacts occur.

**Energetic Particles / Solar Radiation:** The count rate of energetic particles (high energy protons) is expected to persist at Background with no Solar Radiation Storms occurring. However, there is a slight chance of this rising in response to any significant flares that occur.

## Geomagnetic Storms

| Geomagnetic Storm Probability (Exceedance) | Level | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Minor or Moderate | G1 to G2 | No | 5 | 5 | 10 | 20 |
| Strong | G3 | No | 1 | 1 | 5 | 5 |
| Severe | G4 | No | 1 | 1 | 1 | 1 |
| Extreme | G5 | No | 1 | 1 | 1 | 1 |

## Radio Blackouts - X-Ray Flares

| X-Ray Flares Probability | Level | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Active | R1-R2 (M Class) | Yes | 70 | 70 | 70 | 70 |
| Very Active | R3-R5 (X Class) | No | 15 | 15 | 15 | 15 |

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## Solar Radiation Storms (High Energy Protons)

| Radiation Storms Probability (Exceedance) | Level ($cm^{-2}sr^{-1}s^{-1}$) | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| **Active** | **≥ S1** | No | 15 | 15 | 15 | 15 |
| **Very Active** | **≥ S3 *** | No | 1 | 1 | 1 | 1 |
| * S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$) | | | | | | |

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